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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,633	01/31/2006	Katsuo Kazahaya	0523630031	7544

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EXAMINER

MILLER, DANIEL H

ART UNIT

PAPER NUMBER

1794

MAIL DATE

DELIVERY MODE

07/02/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/566,633

**Applicant(s)**

KAZAHAYA ET AL.

**Examiner**

DANIEL MILLER

**Art Unit**

1794

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3 and 5-20 is/are pending in the application.
- 4a) Of the above claim(s) 17-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-85/86)  
Paper No(s)/Mail Date 6/16/2009
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Inventor's Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/23/2009 has been entered.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5-8, 14 and 16 are rejected under 35 U.S.C. 103(a) as obvious over Phillips (US 5,571,615) in view of Tribochemistry Between Hydrogen and Diamond Like Carbon Films, Fontaine; Surface and Coating Technology 146-147 (2001) 286-291 (as evidence of effect of Hydrogen on diamond film structures).

Phillips teaches a cement carbide substrate having a diamond film coating having a grain size of less than about 0.5 microns; within applicant's claimed range (abstract, and claim 2). The diamond coating has a thickness of greater than about 10 micrometers (column 4 lines 50-60). The reference discloses a superior smooth surface (see comments on figures), but does not specifically disclose the claimed surface roughness. However, given that the diamond film has a substantially similar thickness and grain size and is produced via CVD methods, similar to applicant's disclosed method, therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a low surface roughness diamond film by employing known processing conditions for diamond films in order to obtain a surface roughness as low as possible; including a surface roughness less than 0.2 microns, as claimed, since a smooth diamond surface is highly desired by Phillips.

Regarding claims 2-8 and 14 and 16, Phillips discloses a superior smooth surface (see comments on figures) produced via a CVD process, but does not specifically disclose the claimed surface roughness. However, given that the diamond film has a substantially similar thickness and grain size and is produced via CVD methods, similar to applicant's disclosed method (see embodiments in the instant specification); the diamond film would be expected by one of ordinary skill to be optimizable for surface smoothness and evenness (and would be expected to obtain similar aspect ratios given similar grain sizes) in so doing achieve substantially similar physical properties and characteristics as claimed. It is not clear that there are any

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processing conditions that are different between Phillips and the instant claimed invention that would produce differing characteristics.

More specifically regarding claim 16, it is not clear that the further defined process produce a distinctly different product given the instant disclosure and the art of record, therefore the process limitation is not considered to produce a distinct product further defining the claimed product.

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a diamond film of the claimed crystal structures and orientation known in the art which have high aspect ratio within applicant's claimed range (i.e. columnar structures having high aspect ratios). It further would have been obvious to provide any desired thickness including a single crystal thicknesses, and an optimized hydrogen content by varying the processing time and other processing conditions (i.e. pressure; as taught by Phillip see column 4 regarding CVD processing) in order to obtain a diamond film ideal for particular applications limiting the hydrogen content, consistent with hydrogen contents known effect on the physical properties of the diamond film (see *Tribochemistry Between Hydrogen and Diamond Like Carbon Films*, Fontaine; *Surface and Coating Technology* 146-147 (2001) 286-291 as evidence of effect of Hydrogen on diamond film structures). No patentable distinction is seen.

Claims 9-13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Phillips (US 5,571,615), in view of Tribochemistry Between Hydrogen and Diamond Like Carbon Films, Fontaine; Surface and Coating Technology 146-147 (2001) 286-291 as evidence of effect of Hydrogen on diamond film structures), further in view of Kembaiyan et al (US 2004/0060742).

Phillips teaches a cement carbide substrate having a diamond film coating having a grain size of less than about 0.5 microns; within applicant's claimed range (abstract, and claim 2). The diamond coating has a thickness of greater than about 10 micrometers (column 4 lines 50-60). The reference discloses a superior smooth surface (see comments on figures), but does not specifically disclose the claimed surface roughness. However, given that the diamond film has a substantially similar thickness and grain size and is produced via CVD methods, similar to applicant's disclosed method, therefore would be expected to have substantially similar surface roughness.

Kembaiyan teaches a tungsten carbide body containing cobalt and chromium binder material [0023]. Further, the carbide body has a diamond layered face covering the body [0025]. The Cobalt binder can be present between 2% and 12% of the body (see claim 10 ref.); overlapping applicant's claimed range. The tungsten carbide is present at least 80% of the body in some embodiments and from 30% to 99% dependent upon the embodiment (see claims 2 and 25-27 ref). Therefore, the disclosed ranges overlap applicant's claimed ranges of each material.

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a carbide body, as taught by Kembaiyan, and optimize the level of

cobalt and chromium binder within the ranges disclosed by Kembaian (above) to within the corresponding levels claimed by applicant in order to provide the most effective tool body having the most advantageous physical characteristics (i.e hardness and wear resistance).

### ***Response to Arguments***

2. Applicant's arguments filed 9/26/2008 have been fully considered but they are not persuasive.
3. The 102 rejection has been withdrawn due to attorney argument and the affidavit of 5/20/2009. The affidavit seems to establish a difference between the two crystals with regards to there spectroscopic analysis. It appears that applicant has established what he is defining as a "double crystal structure" structure in the affidavit that is not present within the Phillips reference. However, applicant is not claiming a crystal structure with a particular Raman spectroscopy or a "double crystal structure" structure, nor is it clear applicant would have support for such claims.
4. Applicant's arguments and affidavit of 5/20/2009 are not commensurate in scope with the pending claims. Applicant has not claimed a "double crystal structure" but has instead claimed a "aggregation of diamond fine grains" and it is not clear that the two are the same or that they even encompass overlapping structures. While it may be that there are some differences between the disclosed structure and the art of record, it is not clear that there is a difference between the scope of the claimed structure and the art of record. Applicant has not clearly established a difference. For instance, claim 8

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claims a diamond coating "formed as a single layer" and it is not clear how this corresponds with applicant's description of the layer as a "double crystal structure" since the two terms appear to be mutually exclusive.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL MILLER whose telephone number is (571)272-1534. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571)272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John J. Zimmerman/  
Primary Examiner, Art Unit 1794

/Daniel Miller/  
Examiner, Art Unit 1794